

## CLAIMS

1. A method of identifying a coded test unit in a plurality of coded test units comprising the step of:
- 5 contacting the coded test unit with a decoding oligonucleotide comprising an orthogonal nucleobase under conditions in which the decoding oligonucleotide produces a detectable hybridization signal sufficient to distinguish the coded test unit from the remainder of the plurality of coded test units.
- 10 2. A method for decoding a plurality of coded test units comprising the steps of:
- a. identifying a first molecule in the plurality of coded test units according to the method of Claim 1; and
- b. identifying a second substrate in the plurality of coded test units according to the method of Claim 1.
- 15 3. The method of Claim 1 wherein the coded test unit is coded with a decoding oligonucleotide comprising an orthogonal nucleobase.
4. The method of Claim 1 wherein the plurality of coded test units are coded with
- 20 decoding oligonucleotides, wherein each decoding oligonucleotide independently comprises an orthogonal nucleobase.
5. The method of Claim 1, 2, 3 or 4 wherein the orthogonal nucleobase is iso-C, iso-G, K, X or H.
- 25 6. The method of Claim 1 wherein the coded test unit comprises a solid substrate.
7. A method for decoding a plurality of coded substrates comprising the steps of:
- a. identifying a first substrate in the plurality of coded substrates according to the method of Claim 6; and
- 30 b. identifying a second substrate in the plurality of coded substrates according to the method of Claim 6.
8. The method of Claim 6 wherein each coded substrate comprises a test moiety.
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9. The method of Claim 8 wherein the test moiety is an oligonucleotide.
10. The method of Claim 9 wherein a single polynucleotide comprises the test moiety and the coding oligonucleotide.
- 5 11. The method of Claim 9 wherein a first polynucleotide comprises the test moiety and a second polynucleotide comprises the coding oligonucleotide.
12. The method of Claim 6 wherein the plurality of coded substrates is in an array.
- 10 13. A coded substrate comprising a test moiety and a coding oligonucleotide, said coding oligonucleotide comprising an orthogonal nucleobase.
14. The coded substrate of Claim 13 wherein the orthogonal nucleobase is iso-C, iso-G,  
15 K, X or H
15. The coded substrate of Claim 13 wherein the test moiety is an oligonucleotide.
16. The coded substrate of Claim 15 wherein a polynucleotide comprises the test moiety  
20 and the coding oligonucleotide.
17. The coded substrate of Claim 15 wherein a first polynucleotide comprises the test moiety and a second polynucleotide comprises the coding oligonucleotide.
- 25 18. A plurality of coded substrates according to Claim 13.
19. An array of coded substrates according to Claim 13.
20. A kit for decoding a plurality of test units comprising a coded substrate according to  
30 Claim 13 and a decoding oligonucleotide.

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